LONDON-WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA10 | Dunsmore, Wendover and Halton

Data appendix (AQ-001-010)

Air quality

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Department for Transport

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High Speed Two (HS2) Limited,
Eland House,
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1 Introduction

1.1.1 The air quality appendix for the Dunsmore, Wendover and Halton community forum area (CFA10) comprises:

- discussion of the policy framework (Section 2);
- baseline air quality data (Section 3);
- dust impact evaluation and risk rating (Section 4); and
- air quality assessment - road traffic (Section 5).

1.1.2 Maps referred to throughout the air quality appendix are contained in the Volume 5, Air Quality Map Book.

2 Policy framework

2.1.1 Saved Policies GP.8 and GP.95 of the Aylesbury Vale Local Plan[1] seek to protect public amenity. Additionally, the Chiltern Core Strategy[2], in Policy CS4, contains specific measures to minimise impacts on designated local air quality management areas (AQMAs). Saved Policies GC3 and GC9 of the Chiltern Local Plan[3] seek to achieve good standards of amenity and to prevent unacceptable levels of air pollution from new development. Policy CS18 of the Adopted Wycombe Core Strategy[4] and Saved Policy G14 of the Adopted Wycombe Local Plan[5] make similar provision.

2.1.2 The Wycombe Delivery and Site Allocations Plan[5], Policy DM1, seeks reduced travel by private car with the aim of contributing to a higher standard of air quality.

[1] Aylesbury Vale District Council, (2004), *Aylesbury Vale District Local Plan 2004*.
[2] Chiltern District Council,(2011), *Core Strategy for Chiltern District 2011.*
[3] Chiltern District Council, (1997), *Chiltern District Local Plan 1997.*
[4] Wycombe District Council, (2008), *Wycombe Development Strategy Adopted Core Strategy Development Plan Document 2008.*
[5] Wycombe District Council, (2004), *Wycombe District Local Plan (2011* As Saved and Extended September 2007); and replaced by the *Adopted Core Strategy July 2008* and *Delivery and Site Allocations plan* July 2013.

3 Baseline air quality data

3.1 Existing air quality

Local authority review and assessment information

3.1.1 Aylesbury Vale, Chiltern and Wycombe Councils carry out monitoring within their areas in order to help with assessing air quality and to identify any areas where air pollution is close to or already exceeding air quality standards.

3.1.2 As part of its review and assessment process, Aylesbury Vale District Council has declared an AQMA for exceedances of the annual mean nitrogen dioxide (NO2) standard at three areas within the town of Aylesbury. These are outside the study area.

3.1.3 Chiltern District Council's (ChDC's) review and assessment process has identified that the district meets the standards for air quality in the majority of areas. In 2007, ChDC designated an AQMA along Berkhampstead Road/ Broad Street (A416) in Chesham due to exceedances of the NO_2 standard at kerbside monitoring locations. This AQMA is outside the study area.

3.1.4 Wycombe District Council has declared two AQMAs. In 2002 an AQMA was declared around the M40 corridor. More recently the council has declared an AQMA in High Wycombe. Both of these AQMAs are outside the study area.

3.1.5 Local authority review and assessment information indicates that baseline concentrations of NO2 and particulate matter as PM10 and PM2.5 in the study area are likely to be in compliance with air quality standards, given low background concentrations across the district, although higher concentrations will occur in built-up areas.

Local air quality monitoring data

3.1.6 The pollutant concentrations can be compared to the air quality standards:

- 40µg/m^3 as an annual mean for NO2 and PM10;
- 200µg/m^3 one-hour mean for NO2 not to be exceeded more than 18 times a year (equivalent to the 99.8th percentile of the one-hour mean);
- 50µg/m^3 24-hour mean for PM10 not to be exceeded more than 35 times a year (equivalent to the 90.4th percentile of the 24-hour mean); and
- 25µg/m^3 as an annual mean for PM2.5.

3.1.7 There are no monitoring sites within the area that are relevant to this assessment.

Background pollutant concentrations

3.1.8 Estimates of background air quality have been taken from the Department for Environment, Food and Rural Affairs (Defra) maps[6]. Background annual average NO_2 concentrations are within the air quality standard of 40µg/m^3 throughout the study area, with annual mean concentrations in the range 10.1µg/m^3 - 11.6µg/m^3 in 2012. Background annual average PM_{10} concentrations are within the air quality standard of 40µg/m^3 throughout the area, with annual mean concentrations in the range 14.7µg/m^3 - 15.6µg/m^3 in 2012.

Local emission sources

3.1.9 The main source of pollution in the study area is road vehicles. Major roads include the A413 and the B4009.

3.2 Receptors

Human

Construction phase

3.2.1 Potential receptors are primarily those residential properties close to construction activity and alongside roads where traffic flows will change as a consequence of construction activity. Notable receptors in relation to construction activities include properties on Ellesborough Road, Nash Lee Lane and Nash Lee Road. Further properties affected include Larkfield, Hartley Farm, Grove Farm, Hornbeam Cottage and The Laurels. Notable receptors near roads where traffic flows will change are Terrick Row, The Nook, Tethers End and 10 Ellesborough Road. Receptors at greatest risk of dust effects are indicated in Maps AQ-02-010-01 and AQ-02-010-02 (Volume 5, Air Quality Map Book).

Operational phase

3.2.2 Once operational, only receptors located on roads where realignment is required have the potential to be affected. These are limited to receptors on Rocky Lane, Ellesborough Road and the B4009 Nash Lee Road.

Ecological

Construction phase

3.2.3 One Site of Special Scientific Interest (SSSI), Bacombe and Combe Hills, has been considered for the construction dust assessment.

Operational phase

3.2.4 No ecological receptors in the area will be affected by air quality as a result of the operational phase.

[6] Defra; Background Pollutant Concentration Maps; http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html; Accessed: 2012.

4 Dust impact evaluation and risk rating

4.1.1 The following sections provide details of the assessment of construction impacts following the Institute of Air Quality Management (IAQM) guidance[7]. Where considered useful to identify receptors and their relationship to the construction activity, a specific figure is provided. On-site haul movements were assessed explicitly.

4.1.2 The dust assessment criteria for the haul route are based on those for earthworks, as set out in the IAQM guidance. This emission phase was considered to be the most applicable, as the assessment of impacts from earthworks will depend, in part, on the passage of vehicles over open surfaces. It was assumed that significant effects would not occur beyond a distance of 50m from the haul route, again based on interpretation of the earthworks criteria, and that all areas of the haul route will be subject to more than 10 vehicle movements per day. On the basis of criteria for earthworks within the IAQM guidance, the dust emission class for the haul route is large. Wherever there are receptors within 50m of a haul route, the sensitivity of the receiving environment was derived using the IAQM guidance. The need for, and capability of, the local environmental management plan (LEMP) to control these dust emissions, as directed by the draft Code of Construction Practice[8] (CoCP), was then considered in forming the conclusion of the assessment.

Table 1: Evaluation and risk rating of construction activities

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
Cuttings and embankments - The Laurels, Hartley Farm, Hornbeam Cottage and Grove Farm (Map AQ-02-010-01, Figure 10.1, 10.2 and 10.3 (Volume 5, Air Quality Map Book))						
Demolition	20-100m	Medium	Medium	Low	Negligible	1. Potentially dusty construction material. 2. No receptors within 20m of the demolition.
Earthworks	Less than 20m	Large	High	Medium	Negligible	1. Total site area greater than 10,000m^2. 2. Fewer than 10 receptors within 20m of

[7] Institute of Air Quality Management (IAQM), (2011), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance.*
[8] Volume 5: Appendix CT-003-000.

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
						the site.
Construction	Less than 20m	Large	High	Medium	Negligible	1. Use of dusty construction materials. 2. Fewer than 10 receptors within 20m of the site.
Trackout	20-50m	Large	Medium	Low	Negligible	1. More than 100 heavy goods vehicles (HGVs) on road. 2. No receptors within 20m of the road.
Haul route	Less than 50m	Large	High	Medium	Negligible	1. More than 10 HGV movements per day. 2. Fewer than 10 receptors within 50m of haul route.
Wendover and Small Dean viaducts - Hornbeam Cottage (Map AQ-02-010-01, Figure 10.2 (Volume 5, Air Quality Map Book))						
Demolition	100-200m	Medium	Low	Low	Negligible	1. Potentially dusty construction material. 2. No receptors within 20m of the site.
Earthworks	200-350m	Large	Low	Low	Negligible	1. Total site area greater than 10,000m^2. 2. No receptors within 20m of the site.
Construction	200-350m	Large	Low	Low	Negligible	1. Use of dusty construction materials. 2. No receptors within 20m of the site.

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
Trackout	20-50m	Large	Medium	Low	Negligible	1. More than 100 HGVs on road. 2. No receptors within 20m of the road.
Haul route	Less than 50m	Large	High	Medium	Negligible	1. More than 10 HGV movements per day. 2. Fewer than 10 receptors within 50m of haul route.
The Wendover green tunnel - Ellesborough Road (Map AQ-02-010-02, Figure 10.6 (Volume 5, Air Quality Map Book))						
Demolition	Less than 20m	Medium	High	Medium	Negligible	1. Potentially dusty construction material. 2. Fewer than 10 receptors within 20m of the site.
Earthworks	Less than 20m	Large	High	Medium	Negligible	1. Total site area greater than 10,000m^2. 2. Fewer than 10 receptors within 20m of the site.
Construction	20-50m	Large	High	Low	Negligible	1. Use of dusty construction materials. 2. Fewer than 10 receptors within 20m of the site.
Trackout	N/A	N/A	N/A	N/A	N/A	1. No receptors within 500m of site entrance.
Haul route	Less than 50m	Large	High	Medium	Negligible	1. More than 10 HGV movements per day. 2. Fewer than 10

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
						receptors within 50m of haul route.
The Wendover green tunnel - Bacombe and Coombe Hills SSSI (Map AQ-02-010-02, Figure 10.5 (Volume 5, Air Quality Map Book))						
Demolition	Greater than 100m	N/A	N/A	N/A	N/A	1. No demolition within 100m of the site.
Earthworks	20-40m	Small	Negligible	High	Negligible	1. Total site area less than 2,500m^2. 2. Nationally designated receptor within 40m of the site.
Construction	20-40m	Medium	Low	High	Negligible	1. Use of dusty construction materials. 2. Nationally designated receptor within 40m of the site.
Trackout	20-100m	Medium	Low	High	Negligible	1. Fewer than 100 HGVs on road. 2. Nationally designated site within 100m of the site.
Haul route	Greater than 50m	N/A	N/A	N/A	N/A	1. More than 10 HGV movements per day. 2. No receptors within 50m of the route.
The B4009 Nash Lee Road overbridge - Nash Lee Road and Nash Lee Lane (Map AQ-02-010-02, Figure 10.7 and 10.8 (Volume 5, Air Quality Map Book))						
Demolition	N/A	N/A	N/A	N/A	N/A	No demolitions are required.
Earthworks	Less than 20m	Large	High	Medium	Negligible	1. Total site area greater than 10,000m^2.

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
						2. Fewer than 10 receptors within 20m of the site.
Construction	Less than 20m	Large	High	Medium	Negligible	1. Use of dusty construction materials. 2. Fewer than 10 receptors within 20m of the site
Trackout	Less than 20m	Large	High	Medium	Negligible	1. More than 100 HGVs on road. 2. Fewer than 10 receptors within 20m of the site.
Haul route	Less than 50m	Large	High	Medium	Negligible	1. More than 10 HGV movements per day. 2. Fewer than 10 receptors within 50m of the route.

Table 2: Summary of construction dust impacts and effects

Location	Magnitude of impact (with draft Code of Construction Practice[9] mitigation measures)	Effect of dust-generating activities	Additional mitigation
Cuttings and embankments	Negligible	Not significant	None required
The Wendover and Small Dean viaducts	Negligible	Not significant	None required
The Wendover green tunnel	Negligible	Not significant	None required
The Wendover green tunnel - ecological	Negligible	Not significant	None required
The B4009 Nash Lee Road overbridge	Negligible	Not significant	None required

[9] (Volume 5: Appendix CT-003-000).

5 Air quality assessment - road traffic

5.1 Overall assessment approach

5.1.1 The air quality assessment for road related emissions has considered the potential use of different approaches based on the scale of changes in traffic and road alignment. Where the Design Manual for Roads and Bridges[10] (DMRB) thresholds detailed in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) will not be exceeded, no additional assessment is required as the air quality impacts will be minimal. If these thresholds are breached, then a quantitative assessment has been carried out.

5.1.2 In this study area the DMRB screening method was considered to be a suitable tool for the assessment.

5.2 Construction traffic model

5.2.1 Construction traffic information on which this assessment is based is detailed in Volume 5: Appendix TR-001-000. Scenarios assessed were based on maximum traffic on affected roads during the construction phase of the Proposed Scheme.

Receptors assessed

5.2.2 Changes in traffic and the need for road diversions have the potential to change air quality for some receptors. During the construction phase, all road links identified for assessment are due to increases in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Map AQ-01-010 (Volume 5, Air Quality Map Book).

Table 3: Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey coordinates
10-1	10 Ellesborough Road (A413 Nash Lee Road)	486586, 207594
10-2	Terrick Row (B4009 Nash Lee Road)	484007, 208210
10-3	The Nook (A4010 Aylesbury Road/Risborough Road)	483354, 207659
10-4	Tethers End (North Lee Lane)	483606, 208662

Background concentrations

5.2.3 The background concentrations used in the assessment are shown in Table 4 taken from the Defra maps.

[10] Highways Agency, (2007), *The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07).*

Table 4: Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations (µg/m^3)		
	NOx	**NO2**	**PM10**
10-1 10 Ellesborough Road	14.1	9.7	14.0
10-2 Terrick Row	13.6	9.4	14.8
10-3 The Nook	12.9	9.0	14.6
10-4 Tethers End	13.2	9.2	14.8

Design Manual for Roads and Bridges model results

5.2.4 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the Environmental Protection UK (EPUK) methodology[11].

Table 5: Summary of DMRB annual mean NO_2 results (construction phase)

Receptor	Concentrations (µg/m^3)			Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
10-1	13.5	12.0	12.2	0.3	Imperceptible increase	Negligible
10-2	13.5	12.2	12.8	0.7	Small increase	Negligible
10-3	13.8	12.6	13.4	0.8	Small increase	Negligible
10-4	11.5	9.6	10.1	0.5	Small increase	Negligible

Table 6: Summary of DMRB annual mean PM10 results (construction phase)

Receptor	Concentrations (µg/m^3)			Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
10-1	15.2	14.5	14.5	<0.1	Imperceptible increase	Negligible
10-2	16.0	15.3	15.4	0.1	Imperceptible increase	Negligible
10-3	16.0	15.4	15.5	0.1	Imperceptible increase	Negligible
10-4	15.6	14.9	15.0	0.1	Imperceptible increase	Negligible

[11] Environmental Protection UK (EPUK), (2010), *Development Control: Planning for Air Quality*.

Assessment of significance

5.2.5 The overall magnitude of impact of the Proposed Scheme is negligible at worst for NO2 and PM10 during construction. Pollutant concentrations will remain well within air quality standards with and without the Proposed Scheme. AQMAs lie outside the study area.

5.2.6 The changes in air quality at worst-case receptors during the construction phase will not cause significant effects since the adverse impact is negligible, taking into account background air quality and air quality standards.

5.3 Operational traffic model

5.3.1 Operational traffic data on which this assessment is based are detailed in Volume 5: Appendix TR-001-000. Scenarios assessed were based on maximum traffic on affected roads during the operational phase of the Proposed Scheme.

Receptors assessed

5.3.2 The permanent realignment of three roads requires that an assessment of effects is completed. These roads are Rocky Lane, Ellesborough Road and the B4009 Nash Lee Road. Three receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Map AQ-01-010 (Volume 5, Air Quality Map Book).

Table 7: Modelled receptors (operational phase)

Receptor	Description/location	Ordnance Survey coordinates
10-5	The Laurels (Rocky Lane)	487764, 205802
10-6	22 Ellesborough Road/10 Ellesborough Road	486557, 207576
10-7	Bon Accord (B4009 Nash Lee Road (Nash Lee Lane overbridge))	485042, 208825

Background concentrations

5.3.3 The background concentrations used in the assessment are shown in Table 8 taken from the Defra maps.

Table 8: Background 2026 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations (µg/m^3)		
	NOx	NO2	PM10
10-5 The Laurels	10.3	7.3	14.0
10-6 22 Ellesborough Road/10 Ellesborough Road	11.2	7.9	13.3
10-7 Bon Accord	10.6	7.5	14.0

Design Manual for Roads and bridges model results

5.3.4 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the EPUK methodology[11].

Table 9: Summary of DMRB annual mean NO2 results (operational phase)

Receptor	Concentrations (µg/m^3)		Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
10-5	7.6	7.5	-0.1	Imperceptible decrease	Negligible
10-6	9.5	9.4	-0.1	Imperceptible decrease	Negligible
10-7	7.6	7.7	0.1	Imperceptible increase	Negligible

Table 10: Summary of DMRB annual mean PM10 results (operational phase)

Receptor	Concentrations (µg/m^3)		Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
10-5	14.0	14.0	<0.1	Imperceptible decrease	Negligible
10-6	13.7	13.7	<0.1	Imperceptible decrease	Negligible
10-7	14.0	14.0	<0.1	Imperceptible increase	Negligible

Assessment of significance

5.3.5 The overall magnitude of impact is negligible for both NO_2 and PM10 at all receptors assessed during the operational phase of the Proposed Scheme. In some instances, air quality is predicted to improve as a result of the proposed road realignments moving traffic further from receptors. Pollutant concentrations will remain within air quality standards with and without the Proposed Scheme. AQMAs lie outside the study area.

5.3.6 The changes in air quality at the most affected receptors during the operation phase will not cause significant effects since the adverse impact is negligible at worst, taking into account background air quality and air quality standards.

6 References

Aylesbury Vale District Council, (2004), *Aylesbury Vale District Local Plan.*

Chiltern District Council, (1997), *Chiltern District Local Plan.*

Chiltern District Council, (2011), *Core Strategy for Chiltern District.*

Department for Environment, Food and Rural Affairs (Defra), (2010), *Defra background maps* 2010; http://laqm.defra.gov.uk/maps/maps2010.html; Accessed: July 2013.

Environmental Protection UK (EPUK), (2010), *Development Control: Planning for Air Quality.*

Highways Agency, (2007), *The Design Manual for Roads and Bridges* (Volume 11, Section 3, Part 1 Air Quality HA207/07).

Institute of Air Quality Management (IAQM), (2011), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*.

Wycombe District, (2004), *Wycombe District Local Plan.*

Wycombe District Council, (2008), *Wycombe Development Strategy Adopted Core Strategy Development Plan Document.*